

WHAT IS CLAIMED IS:

1 1. A method for preserving layer 2 address information or
2 information replacing a layer 2 address of a client device
3 which sourced a virtual private network packet, the method
4 comprising:

5 a) determining a new layer 3 destination address
6 based on at least a portion of a layer 3
7 destination address of the virtual private
8 network packet; and

9 b) encapsulating the virtual private network
10 packet with a layer 3 source address, the new
11 layer 3 destination address determined, a layer 2
12 source address and a layer 2 destination address.

1 2. The method of claim 1 wherein the layer 3 source
2 address corresponds to the layer 3 address of an ingress
3 access router.

1 3. The method of claim 1 wherein the new layer 3
2 destination address determined corresponds to the layer 3
3 address of an egress access router.

1 4. A method for forwarding a virtual private network
2 packet in which layer 2 address information or information
3 replacing a layer 2 address of a device has been preserved,
4 in which layer 3 destination address information has been
5 preserved and which includes a second layer 3 destination
6 address which corresponds to an egress access router, the
7 method comprising:

- 8 a) de-encapsulating the virtual private network
9 packet by removing the second layer 3 destination
10 address;
11 b) determining a new destination layer 2 address
12 based on (i) at least a portion of the preserved
13 layer 3 destination address information, and (ii)
14 at least a portion of the layer 2 address
15 information or the information replacing the
16 layer 2 address of the device; and
17 c) replacing a destination layer 2 address with
18 the new destination layer 2 address determined.

1 5. A machine readable storage means having stored thereon
2 a packet sourced from a client device which defined a layer
3 3 destination address for the packet and which includes a
4 layer 2 source address and a layer 3 source address, the
5 packet comprising:

- 6 a) a first field for storing data;
7 b) a second field for storing the layer 3 destination
8 address defined by the source device;
9 c) a third field for storing a new layer 3
10 destination address.

1 6. The machine readable storage means of claim 5 wherein
2 the new layer 3 destination address stored in the third
3 field corresponds to a layer 3 address of an egress access
4 router.

1 7. The machine readable storage means of claim 5 wherein
2 the new layer 3 destination address stored in the third
3 field is based on at least a portion of the layer 3
4 destination address defined by the source device.

1 8. The machine readable storage means of claim 5 wherein
2 the packet further comprises:

3 d) a fourth field for storing a bit string associated
4 with a port with which the client device sourcing the
5 packet is associated.

1 9. The machine readable storage means of claim 8 wherein
2 the new layer 3 destination address stored in the third
3 field is based on at least a portion of the layer 3
4 destination address defined by the client device sourcing
5 the packet and at least a portion of the bit string stored
6 in the fourth field.

1 10. The machine readable storage means of claim 8 wherein
2 least a portion of the unique bit string stored in the
3 fourth field represents one or more services for which the
4 client device sourcing the packet is authorized.

1 11. The machine readable storage means of claim 8 wherein
2 least a portion of the unique bit string stored in the
3 fourth field represents a multicast group to which the
4 client device sourcing the packet belongs.

1 12. The machine readable storage means of claim 8 wherein
2 least a portion of the unique bit string stored in the
3 fourth field represents a service level with which the
4 client device sourcing the packet is subscribed.

1 13. The machine readable storage means of claim 8 wherein
2 least a portion of the unique bit string stored in the

3 fourth field represents a location of a logical ingress
4 port.

1 14. The machine readable storage means of claim 8 wherein
2 least a portion of the unique bit string stored in the
3 fourth field corresponds to a VPN-OUI.

1 15. The machine readable storage means of claim 8 wherein
2 least a portion of the unique bit string stored in the
3 fourth field corresponds to a VPN-INDEX.

1 16. An apparatus for routing virtual private network
2 packets, each of the packets including layer 2 address
3 information or information replacing a layer 2 address of a
4 client device which sourced a virtual private network
5 packet, the apparatus comprising:

6 a) a table including a layer 3 destination address of
7 the virtual private network packet and an associated
8 layer 3 address of an egress access router;

9 b) means for determining a new layer 3 destination
10 address based on the contents of the table; and

11 c) means for encapsulating the virtual private
12 network packet with the new layer 3 destination
13 address determined.

1 17. A machine readable medium having stored thereon a data
2 structure, the data structure having a plurality of
3 records, each of the records comprising:

4 a) a first field for storing a layer 3 destination
5 address; and

6 b) a second field for storing a layer 3 address of an
7 egress access router associated with layer 3
8 destination address of the first field,
9 wherein the egress access router is a router at
10 the edge of a network.

1 18. The machine readable medium of claim 17, each of the
2 records further comprising:

3 c) a third field for storing a string of bits in the
4 place of a layer 2 address associated with the
5 client device which sourced the virtual private
6 network packet.